Effective Load Carrying Capacity ("ELCC") Calculations

Background

In Order No. 2020-832 in Docket No. 2019-226-E the South Carolina Public Service Commission required the Company to update its calculation of an ELCC capacity value for solar of 11.8%. The order stated the following:

> *In Order No. 2020-244, the Commission ordered DESC to apply an ELCC value of 11.8% based on existing levels of solar on the DESC system at that time. In its Modified 2020 IRP, DESC shall calculate the current ELCC capacity value for solar based on the current level of operational solar on DESC's system, and DESC shall apply that value in its modeling of PV resources.*

The calculation of the 11.8% ELCC value was presented in direct testimony in Docket No. 2019-184-E in Table 3b on page 10. The link to access this testimony is:

https://dms.psc.sc.gov/Attachments/Matter/f5f9bb34-d3e8-4db7-9ca5-e949ad51e70a

Table 3b showing the ELCC calculation of 11.8% is reproduced below:

ELCC Results				
Step	Case	Description	Capacity	LOLH
1	Base	500 MW Solar	5,125 MW	2.86
2	Change	1,000 MW Solar	5,125 MW	2.13
3	Adjusted	1,000 MW Solar	5,066 MW	2.86
		ELCC Value	59 MW	11.8%

This calculation assumes that there is 500 MWs of solar capacity already existing on the system and that the ELCC methodology is being used to place a capacity value on an additional 500 MWs of solar capacity. The ELCC methodology assigns a capacity value by equating reliability as measured by a reliability index in a before and after situation. The reliability index used here is the Loss of Load Hours ("LOLH") index and the before and after situation is with and without the incremental 500 MWs of solar capacity. In Step 1 in the table the base is shown already having 500 MW of solar and 5,125 MW of capacity with a LOLH index of 2.86 hours per year of expected capacity shortfall. In Step 2 the impact of adding another 500 MWs of solar is shown. The LOLH index decreases to 2.13 implying an increase in reliability. The goal of Step 3 is to return the LOLH index back to the base setting of 2.86 hours by either increasing the system

loads or equivalently decreasing the system capacity, Since there are 8,760 hours of system loads, it is easier to simply reduce the system capacity which is what is done here. In Step 3 then the system capacity is reduced by 59 MWs which decreases system reliability to the point where the LOLH index returns to the base level of 2.86 hours. Therefore, the ELCC capacity value of the additional 500 MWs is 59 MWs of firm capacity because the two changes to the system produce equal changes in system reliability as measured by the LOLH index.

Updated ELCC Calculation

In the context of the Company's Modified 2020 IRP, the system already includes 973 MWs of solar capacity and the ELCC methodology will be used to place a capacity value on an additional 100 MWs of solar. The following table shows the results of the 3-step ELCC evaluation process.

ELCC Results				
Step	Case	Description	Capacity	LOLH
1	Base	973 MW Solar	5,067 MW	2.86
2	Change	1,073 MW Solar	5,067 MW	2.78
3	Adjusted	1,073 MW Solar	5,062 MW	2.86
		ELCC Value	5 MW	5%

The table shows that when adding 100 MWs of solar capacity to the existing 973 MWs producing a total of 1,073 MWs of solar capacity, the system becomes more reliable as indicated by the decrease in the LOLH index to 2.78 hours. In Step 3 the system capacity is decreased by 5 MWs thereby decreasing reliability and bringing the LOLH index back to the base level of 2.86 hours. Therefore, the ELCC capacity value of the incremental 100 MWs of solar capacity is 5 MWs or 5% of solar nameplate.